BUREAU OF SAFETY

REPORT NO. 1943

Railroad:	Boston and Maine
Date:	November 9, 1954.
Location:	Ayer, Mass.
Kind of accident:	Head-end collision
Trains involved:	Passenger and passenger
Casualties:	1 killed; 15 injured
Summary of facts:	Train overran stop signal and collided with anotner train making cross-over movement.
Cause of accident:	Failure of engineman to obey signal indications.

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN ACCIDENT ON THE BOSTON AND MAINE RAILROAD AT AYER, MASS., ON NOVEMBER 9, 1934.

January 10, 1935.

To the Commission:

On November 9, 1934, there was a head-end collision between two passenger trains on the Boston and Maine Railroad at Ayer, Mass., which resulted in the death of 1 employee, and the injury of 9 passengers, 3 mail clerks and 3 employees. The investigation of this accident was held in conjunction with representatives of the Massachusetts Department of Public Utilities.

Location and method of operation

This accident occurred on that part of the Fitchburg Division extending between Bellows Falls, Vt., and Ayer, Mass., a distance of 77.77 miles; in the vicinity of the point of accident this is a double-track line over which trains are operated by time table, train orders, an automatic block-signal system, and an automatic train-stop system with 2-indication cab signals, the latter being of the continuous-inductive type. At Ayer the Portland Division intersects the Fitchburg Division and trains from the former division cross the Fitchburg Division tracks through a series of cross-overs and wye tracks. The accident occurred within interlocking limits on the west-bound main track of the Fitchburg Division, at a point 845 feet east of the east end of the station. Approaching this point from the west on the Fitchburg Division, there is a 2°30' curve to the right 1,130 feet in length and tangent track for a distance of 1,720 feet, followed by a 2°04' curve to the right 1,215 feet in length, the accident occurring on this latter curve at a point 507 feet from its western end. The grade is level at the point of accident.

The interlocking plant is of the electro-pneumatic type; the signals involved are automatic signal 370 and interlocking signals R-10 and R-30, located on the Fitchburg Division at points 6,380 feet, 1,987 feet and 424 feet, respectively, west of the point of accident, and interlocking signal L-40 located on the Stony Brook Branch of the Portland Division 606 feet east of the point of accident. Signal 370 is of the 2-arm, 2-position, lower-quadrant type, and operating in conjunction

Inv. No. 1943
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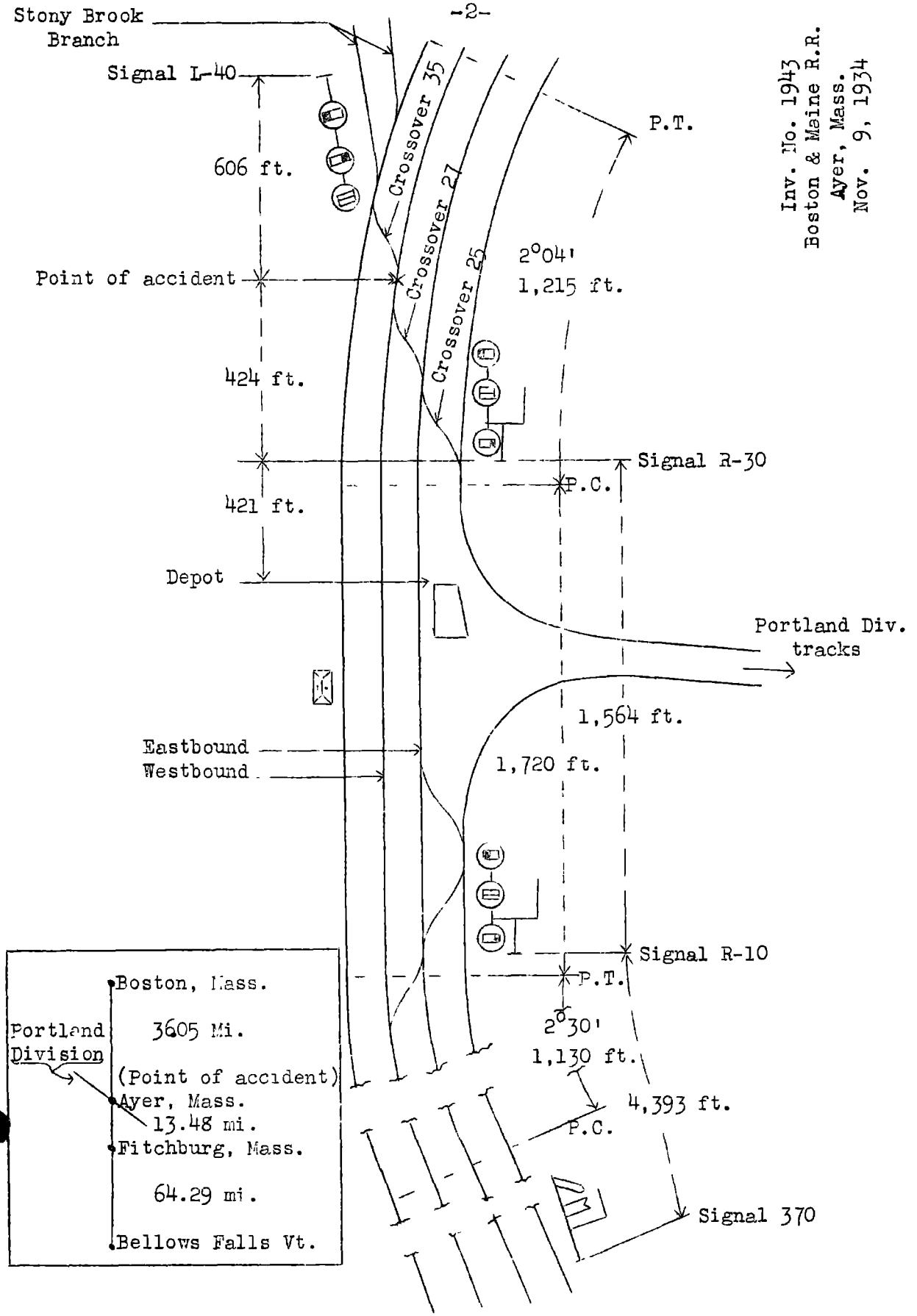

with interlocking signals R-10 and R-30 it displays an approach indication when either of these two interlocking signals is at stop. The interlocking signals are of the 3-unit, color-light type; the top unit governs main line movements and displays either red or green, the middle unit governs diverging movements and also displays red or green, and the bottom unit displays either red or yellow, being a calling-on signal. An approach indication at automatic signal 370 requires passenger trains to reduce speed at once to not exceeding 30 miles per hour and be prepared to stop at either of the two interlocking signals; signal R-10 can display a green indication on the top unit with the succeeding signal, R-30, at stop. At the time of the accident the route was lined for a movement of a Portland Division train across the Fitchburg Division tracks via cross-overs 35, 27, and 25; signal L-40 on the Stony Brook Branch of the Portland Division was displaying the indication authorizing this movement, with Fitchburg Division signal R-30 at stop, signal R-10 at proceed, and automatic signal 370 at approach.

The weather was clear and it was dark at the time of the accident, which occurred about 6:26 p.m.

Description

Train No. 836, a west-bound passenger train, consisted of 1 combination mail and baggage car and 1 coach, hauled by engine 3674, and was in charge of Conductor Parks and Engineman Goss. This train departed from North Chelmsford on the Stony Brook Branch of the Portland Division, 13.19 miles east of Ayer, at 6:10 p.m., 10 minutes late, entered the tracks of the Fitchburg Division at Ayer under the indication of signal L-40 authorizing this movement, and was moving through the cross-overs at a low rate of speed en route to its destination on the Portland Division, when it collided with Train No. 5510.

Train No. 5510, an east-bound passenger train, consisted of 3 milk cars, 1 combination mail and baggage car, 1 combination car, 1 coach and 1 Pullman car, hauled by engine 3621, and was in charge of Conductor Clark and Engineman Foster. This train departed from Bellows Falls on the Cheshire Branch of the Fitchburg Division at 4:05 p.m., on time, left Fitchburg, 13.48 miles from Ayer, at 6:09 p.m., 4 minutes late, passed signal 370 displaying an approach indication, the engineman having operated the acknowledging lever to forestall operation of the automatic train-stop device, passed signal R-10 which was displaying a proceed indication on the top unit, passed signal R-30 displaying a stop indication, ran through the switch leading to the wye, entered the open cross-over leading to the west-bound

track, and collided with Train No. 836 at a point 845 feet east of the east end of the station while traveling at a speed believed to have been at least 12 miles per hour.

The impact badly damaged the front end of each engine and the first two cars in Train No. 5510 were telescoped. The employee killed was the conductor of Train No. 836, and the employees injured were the fireman of the same train and the engineman and the baggageman of Train No. 5510.

Summary of evidence

Engineman Goss, of Train No. 836, stated that upon arriving at Ayer a green indication was displayed on the middle unit of signal L-40, authorizing his train to proceed through the cross-overs on the Fitchburg Division. While making this movement he saw the headlight of Train No. 5510, which train he usually meets at this point every night; at first he thought the train was stopped, but when he discovered that it was moving he tried to stop his own train in order to avoid an accident. Afterwards he saw the engineman of Train No. 5510 and the latter said his brakes did not work. Baggageman Towle, of Train No. 836, saw the signal indication permitting the train to enter the Fitchburg Division and he said that speed was reduced but that his train did not stop. He did not look out again as he assumed that the route was properly lined for the cross-over movement.

Engineman Foster, of Train No. 5510, stated that he had operated engine 3621 for several days prior to the accident and before leaving Bellows Falls on the day of the accident he tested the automatic train-stop mechanism on the engine and found it to be functioning properly. A car inspector reported that the brakes on the train were in good condition, while a running test was made after leaving that point which proved satisfactory, and he experienced no difficulty in making station stops and in reducing speed en route, the last point where speed was reduced being on a curve approximately 6 miles west of Ayer, where speed was reduced from 60 to 45 miles per hour. He was thoroughly familiar with the location of the signals approaching Ayer and understood their indications and requirements; when he observed signal 370 displaying an approach indication, which he could see clearly for a considerable distance, he tried the brakes but did not get the proper response, although the brake-pipe exhaust sounded all right and the air gauges showed the proper pressures. Engineman Foster then made a heavier reduction, which took some effect, but when the engine passed the interlocking tower just west of the station he realized that the train was not under proper control and moved the brake-valve into emergency position without having

released the brakes following the previous service reduction, and he thought he opened the sanders. At the time he first applied the brakes he estimated the speed at 50 miles per hour, at about 15 miles per hour when he made the emergency application, and about 12 miles per hour at the time of the accident, not having been able to effect any material reduction in speed after the emergency application. Engineman Foster thought possibly some one had tampered with the angle cocks near the head end and after the accident he went back to examine the equipment, but on account of the damage sustained by the first two cars he could not determine the position of the angle cocks between them; the pistons were out on the third and fourth cars and he made no further examination of the equipment. Afterwards he handled the five rear cars to destination and he said he did not think the brakes responded properly in making a station stop at Littleton, 4.18 miles from Ayer, and when the brakes again were examined after reaching Boston he saw that the piston travel on the Pullman was only 3 inches, while on the balance of the cars the piston travel was about 5 inches. It further appeared from Engineman Foster's statements that it was customary for him to receive an approach indication at signal 370; also that on this particular occasion he operated the acknowledging lever of the automatic train-stop device when passing that signal, thus forestalling an automatic application of the air brakes. He thoroughly understood that the green indication displayed by the top unit of signal R-10 merely showed that the track was clear as far as signal R-30, and he also understood that with an approach indication displayed at signal 370 he had to be prepared to stop either at signal R-10 or at signal R-30.

Fireman Hatfield, of Train No. 5510, stated that the train approached signal 370 at a speed between 40 and 50 miles per hour and when he observed the signal displaying a caution indication, approximately one-fourth mile distant, he called the indication to the engineman and the engineman acknowledged it and applied the brakes; the brakes did not seem to take proper hold, although speed was reduced to 15 or 20 miles per hour when the train passed the tower. He jumped off when the train passed signal R-30 in stop position and he saw Train No. 836 making the cross-over movement, and at that time his train was traveling about 8 or 10 miles per hour. After the accident the engineman remarked that he did not have any brakes and the fireman examined the angle cocks on the rear end of the tender and the forward end of the first car, a few minutes after the accident, and found them open, but did not examine the balance of the braking equipment. He said that the engineman operated the brakes in the usual manner after receiving the approach indication at signal 370, but was not certain whether he released them after they were first applied.

Baggageman Spicer, of Train No. 5510, stated that after leaving Fitchburg he felt a brake application at Derby curve and the brakes appeared to hold properly, while another application was made at some point west of signal R-10 and he thought a good station stop would be made at Ayer, but when he noticed that the train was passing the station he tried to signal the engineman with a lantern from his position on the steps of the fifth car. About 20 or 30 minutes after the accident he examined the brakes on the five rear cars and found them still applied, the piston on the Pullman being out about 3 inches, and he later accompanied these cars through to destination and noticed nothing unusual with the braking power in making stops en route.

Conductor Clark, of Train No. 5510, stated that the train made station stops between Bellows Falls and Fitchburg without overrunning any of the stations and when the brakes were applied at Derby curve they took hold properly. He paid no further attention to the operation of the train until he discovered that it was traveling too fast to stop at the station at Ayer and he then pulled the signal cord; he did not feel an emergency application of the brakes, the train seeming to slacken and then slide along. At the time he signaled the engineman he estimated the speed at 7 or 8 miles per hour and at not more than 5 miles per hour at the time of the accident. Before reaching Ayer there was no indication of anything being wrong with the brakes and he did not think that the train was out of control, but was of the opinion either that the train approached the station at too high a rate of speed or that the engineman failed to begin braking soon enough. He had worked with Engineman Foster for several years and considered him competent, although he overran the same station stop about one car length with Train No. 5510 on November 7.

Flagman Odell, of Train No. 5510, stated that he was on the platform between the fifth and sixth cars and felt an application of the brakes at the cross-overs a short distance west of the station at Ayer. About 45 minutes after the accident he looked at the angle cocks and found them open on the rear end of the tender, on the first car, and on the last five cars; he did not notice the pistons. Flagman Odell talked with some one who had been at the station and was told that fire was flying from the wheels when the train passed that point.

Engineman Tibbetts stated that he was in the fifth car of Train No. 5510 and noticed an application of the brakes at Derby curve; this application reduced the speed to the required limit and then the brakes were released. As the train approached the station the speed was further reduced, although he had felt no brake application on the car in which he was riding, and he estimated the speed at 20 miles per hour when the train passed the station. Towerman Sidney, who was going to ride on Train No. 5510 to Boston, where he is employed, stated that he was on the station platform when Train No. 5510 passed, traveling at a speed

of about 20 miles per hour. Realizing that it was not going to stop, he ran after the train and saw fire flying from the wheels at the head end but not until the engine had passed signal R-30.

Wreckmaster Hauer was arrived at the scene of accident about 20 minutes after its occurrence and later examined the angle cocks on the five rear cars; all of them were open and this portion of the train was intact and in normal operating condition. Car Inspector Lawrence also examined the equipment at the scene of accident and recovered from the wreckage a part of the train line connection between the first two cars and he said the angle cock on this broken part was open.

Vice President and General Manager Smith arrived at the scene of accident about 8:40 p.m. and made an inspection of the damaged equipment. The brake-pipe connections between the first and second cars were broken off and damaged, but when recovered the angle cocks were found to be open, with no indication of having been turned to that position as a result of being struck by wreckage.

Engine Inspector Nelson stated that before Train No. 5510 departed from Bellows Falls he inspected engine 3621, including a test of the brakes and the automatic train-stop mechanism, and found all apparatus in proper operating condition. Car Inspector Marcier, located at Fitchburg, said he inspected Train No. 5510 upon its arrival at that point; all angle cocks were open and the air-brake apparatus was in proper working order, no changes being made; he did, however, cut the steam hose connections between the tender and first car, and also between the first two cars, in order to facilitate setting out the first car at Ayer. He did not see any trespassers on the train while it was at Fitchburg.

General Air Brake Inspector Baker stated that he inspected engine 3621 after the accident. The automatic train-stop mechanism was in good condition except for a broken receiver bar. The brakes on the engine and tender were tested and functioned properly and then the brake pipe was dismantled and thoroughly examined for obstructions, but none was found. The engine had ET equipment and was carrying main-reservoir pressure of 130 pounds and brake-pipe pressure of 110 pounds. The brakes on the five rear cars were tested collectively as well as individually; the piston travel varied from 5 to 7¾ inches, and on the Pullman, which had LN equipment, it was 5 inches on one cylinder and 6 inches on the other cylinder, while with an emergency application the piston travel varied from 5¾ to 8 inches. Each cylinder also was tested for leakage and it was found that on the car which had been the third car in the train the leakage was 13 pounds per minute; on the last four cars the brake cylinder leakage varied from 5 pounds per minute down to no leakage on the

Pullman. The first three of these cars had PM brake equipment, the fourth had UC and the fifth had LN equipment. Mr. Baker said the three cars with PM equipment had 13, 16 and 14-inch cylinders; with a 20-pound brake-pipe reduction the approximate brake-shoe pressures would be 5,650 pounds, 10,050 pounds, and 7,700 pounds, respectively. These inspections and tests were conducted without any repairs or changes having been made and Mr. Baker said there was nothing to indicate that the brakes were not in working order at the time of the accident.

Superintendent of Car Maintenance Jangro stated that he was on duty at Boston when Train No. 5510 arrived at that point with five cars. With the assistance of other employees the brakes on these cars were tested; it was found that following a service application the piston travel ranged from 5 to 7¼ inches, and with an emergency application the piston travel was slightly increased. This was the test at which Engineman Foster was present, and Mr. Jangro was unable to explain the engineman's statement that the piston travel on the Pullman was 3 inches unless he measured from the back of the push rod, which would be about that distance.

Conclusions

This accident was caused by the failure of Engineman Foster, of Train No. 5510, properly to obey signal indications, probably due either to misjudgment of speed or of stopping distance.

The rules provide that when an approach signal indication is displayed a train must prepare to stop at the next signal and if exceeding medium speed it must at once reduce to that speed; for passenger trains "medium speed" is defined as not exceeding 30 miles per hour. Signal 370 was displaying an approach indication and Engineman Foster said he applied the brakes before reaching that signal, at which time the speed of his train was about 50 miles per hour, however, he said he did not get the proper response and then he made a heavier reduction; when just west of the station, traveling at a speed which he estimated at 15 miles per hour, he realized the train was not under control and applied the brakes in emergency but succeeded in reducing the speed only from 15 to 12 miles per hour by the time the accident occurred, about 1,000 feet east of where he said he made the emergency application and 424 feet east of signal R-30, which displayed a stop indication. The evidence, however, failed to support the engineman's belief that there was something wrong with the brakes. They had been tested before the train departed from Bellows Falls and had operated properly en route, which included descending a long heavy grade west of Fitchburg, 13.48 miles from Ayer. The stop at Fitchburg was made without difficulty, a car inspector then looked over the train, and after it departed from that point the engineman used the brakes on a

curve about 6 miles from Ayer and they operated properly in reducing the speed from 60 to 45 miles per hour. Examination of the equipment immediately after the accident showed that the brakes were applied and that there were no closed angle cocks; the air-brake appurtenances on the engine were subjected to careful examination and test without finding a defective condition or stoppage of any kind, and the undamaged portion of the train was handled properly by Engineman Foster when the train finally proceeded to Boston, at which latter point the brakes again were examined and found to be in working order. In view of these facts it is believed that the air-brake system on this train was in working order and that Engineman Foster's failure to stop at the station and before passing signal R-30, which was displaying stop, was due either to misjudgment of speed or to misjudgment of stopping distance. While members of the train crew were paying no particular attention to the speed of this train as it approached Ayer, when it was close to the station they realized that the speed was too high to enable the train to make the station stop; the conductor used the communicating signal cord in signaling the engineman to stop and the baggageman gave stop signals with a lantern. In view of these facts and considering the distance by which this train overran the station and the stop signal, as well as the damage which resulted from the collision, it is believed that the actual speed of this train when it passed the station was considerably in excess of the rate of 15 miles per hour as estimated by Engineman Foster.

This accident must be added to the growing list of those which have occurred in automatic train-stop territory where enginemen have forestalled automatic application of the brakes and then for one reason or another have failed properly to control their trains in accordance with signal indications. This subject has been discussed in several previous reports and this discussion need not be repeated here. However, particular attention is directed to our reports covering the accidents at the intersection of the Milwaukee tracks with those of the Omaha at Camp Douglas, Wis., on February 28, 1931, and on the New York Central at Rugers, N. Y., on August 31, 1934.

Engineman Foster, who was over 75 years of age, had been in the service of this company more than 52 years; his record was good. He had received his last physical examination only a month prior to the accident, had been examined on the rules, and successfully passed several surprise tests during the early part of 1934.

Respectfully submitted,

W. J. PATTERSON,

Director.